EPA Region 7 TMDL Review

TMDL ID:	KS-LA-12-W050_4	**Waterbody ID(s):**	KS-LA-12-W050_4
Waterbody Name(s):	Sand Creek		
Tributary(ies):	Mud Creek (16) and Beaver Creek (26)		
Pollutant(s):	Biological oxygen demand and nutrients		
State:	KS	**HUC(s):**	11030012
Basin:	Lower Arkansas (subbasin – Little Arkansas)		
Submittal Date:	December 11, 2006		
Approved:	Yes		

Submittal Letter

State submittal letter indicates final Total Maximum Daily Load(s) (TMDL) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by EPA, date of receipt of any revisions, and the date of original approval if submittal is a phase II TMDL.

This TMDL was officially submitted by the State of Kansas in a letter dated December 5, 2006 and received by EPA on December 11, 2006. The public comment portion of the submission was received by EPA on January 9, 2007. Additional information as a response to EPA requests after submittal was received March 22, 2007.

Water Quality Standards Attainment

The water body's loading capacity (LC) for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards (WQS) [40 CFR § 130.7(c)(1)]. A statement that WQS will be attained is made.

The dissolved oxygen impairment is being addressed through assigning LCs for biological oxygen demand (BOD), total phosphorus (TP), and total nitrogen (TN). BOD is a typical target of TMDLs and WLAs to ensure meeting DO criteria. Nutrients are also targeted as increased nutrient levels have also been shown to be a causative effect of low DO. The loading capacity for BOD, TN, and TP are expressed in load duration curves. At median (50% tile) flow this is 501.2 lbs/d BOD (warm weather), 326.9 lbs/d TN, and 111 lbs/d TP. Meeting the LC should result in the attainment of WQS.

Numeric Target(s)

Submittal describes applicable WQS, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

In surface waters designated for the Aquatic Life Support, the concentrations of dissolved oxygen (DO) shall not be lowered by the influence of artificial sources of pollution. DO: 5 mg/L –Aquatic Life Support criteria are provided in table 1g of KAR 28-16-28e(d).

Nutrients – Narratives: The introduction of plant nutrients into streams, lakes or wetland from artificial sources shall be controlled to prevent the accelerated succession or replacement of aquatic biota or the production of undesirable quantities or kinds of aquatic life (KAR 28-16-28e(c)(2)(A)).

Designated beneficial uses are Expected Aquatic Life Support, Primary Contact Recreation "B" and Food Procurement Use for Main Stem Segment. Tributary segments designed uses are Expected Aquatic Life Support and Secondary Contact Recreation "b" for Mud and Beaver Creeks.

The impaired use is Expected Aquatic Life Support.

The submittal targets LCs for BOD, TN, and TP to achieve the DO WQS.

Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety (MOS) that do not exceed the LC. If submittal is a phase II TMDL there are refined relationships linking the load to WQS attainment. If there is an increase in the TMDL there is a refined relationship specified to validate the increase in TMDL (either load allocation (LA) or waste load allocation (WLA)). This section will compare and validate the change in targeted load between the versions.

The submittal uses a Streeter-Phelps model to establish target BOD WLAs which will result in compliance with the DO standard. Additionally, LCs are developed for TN and TP to address excursions seen since the upgrade of the Newton WWTP. TN and TP were targeted based on comparisons between the impaired watershed and a reference watershed of similar size located in the subbasin. LCs for TN and TP are made to bring the watershed into compliance with the State Nutrient Reduction Goals (TN=8 mg/L and TP=1.5 mg/L).

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered. If this is a phase II TMDL any new sources or removed sources will be specified and explained.

Point sources are identified with two POTWs providing significant loads of the targeted pollutants. The remainder of the facilities are listed in an appendix along with their WLAs. The two significant POTWs are municipal wastewater treatment plant for Newton (M-LA13-IO01) and Walton (M-LA-OO01).

The land use in the watershed is primarily cultivated cropland (70%). Urban uses account for 7%, prairie 6%, and forest 3% while conservation reserve program (CRP) lands make up 4%. Cultivated land is also the predominant riparian land use (41%).

There are 15 confined animal feedlots operating in the watershed. Only one is large enough to be permitted. All these facilities are designed to minimize or retain runoff from their operations. There should be no runoff generated from rainfall events equal to a 25 year recurrence 24 hour rainfall total. The potential census of animals in the watershed is 5,980 (3,580 within the riparian corridor) but the actual number of animals is typically less.

Data from the 1990 and 2000 US Census Bureau shows there are approximately 3,200 people connected to on-site waste systems (i.e. septic tanks). Failing on-site systems can be a significant source of the pollutants targeted in this TMDL.

Rainfall in the watershed can be expected to generate surface runoff at rainfall intensities of less than one inch per hour. At these rainfall rates runoff can be expected from 74% of the watershed, as rainfall rates climb to 1.5 inches per hour the area contributing to surface runoff increases to 82%.

Natural background sources are identified as wildlife and streamside vegetation.

It seems all sources have been considered.

Allocation - Loading Capacity

Submittal identifies appropriate WLA for point, and load allocations for nonpoint sources. If no point sources are present the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2(i)]. If this is a phase II TMDL the change in LC will be documented in this section.

LC is expressed as a daily load through the use of a load duration curve. Both LAs and WLAs are assigned in this TMDL.

WLA Comment

Submittal lists individual WLAs for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to WQS excursions, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLAs. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a phase II TMDL any differences in phase I and phase II WLAs will be documented in this section.

WLAs are set for BOD, nitrate-N, and TP. The BOD WLA for Newton WWTP is 501.2 lbs/d April-October, 626.5 lbs/d February, March, and November, and 751.8 lbs /d for January and December. WLAs for nitrate-N 174.0 lbs/d and for TP 37.6 lbs/d. The WLAs for the Walton WWTP are 9.5 bls/d BOD, 2.2 lbs/d nitrate-N, and 0.6 lbs/d TP.

All other permitted facilities are assigned WLAs of 0 (zero) for BOD, nitrate-N, and TP. These are listed in the TMDL's Appendix A

LA Comment

Includes all nonpoint sources loads, natural background, and potential for future growth. If no nonpoint sources are identified the LA must be given as zero [40 CFR § 130.2(g)]. If this is a phase II TMDL any differences in phase I and phase II LAs will be documented in this section.

LAs are expressed as lbs/d in a load duration curve. At median flow this is equivalent to 210.4 lbs/d BOD, 150.7 lbs/d N, and 72.8 lbs/d TP. The TMDL document also gives expressions of the LA at flows exceeded 25% and 10% of the time.

Margin of Safety

Submittal describes explicit and/or implicit MOS for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a phase II TMDL any differences in MOS will be documented in this section.

The MOS is expressed as implicit. Conservative assumptions include reductions in WLA that target BOD, TN, and TP below TMDL targets under critical seasonal conditions. According to the Streeter-Phelps model, BOD LCs alone should result in Sand Creek meeting WQS. The TMDL includes nutrient reductions in addition to the BOD WLAs. Targeting these additional pollutants serves as a conservative method to ensure compliance.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of WQS. If this is a phase II TMDL any differences in conditions will be documented in this section.

Seasonal variation is accounted for by this TMDL, since the TMDL endpoint is sensitive to the low flow and temperature conditions, usually occurring in the summer and fall seasons. As indicated earlier, while BOD is not considered a single dominant factor leading to the DO excursions at Site 535, it has been evaluated during low DO periods and the BOD target will be to maintain the historical range of a 4-5 mg/L BOD associated with adequate DO on Sand Creek at Site 535. WLAs for the major WWTP are also based on seasons. The load duration curve also account for seasonal variation in that it represents LC at all flows.

Public Participation

Submittal describes required public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].

Public Meetings: An active Internet site was established at http://www.kdheks.gov/tmdl/public.htm to convey information to the public on the general establishment of TMDLs and specific TMDLs for the Lower Arkansas Basin. Public Hearing: A Public Hearing on the TMDL of the Lower Arkansas Basin was held in Hutchinson, KS on September 13, 2006.

Basin Advisory Committee: The Lower Arkansas Advisory Committee met to discuss the TMDLs in the basin on March 8, June 7, and October 12, 2006.

Discussion with Interest Groups: The staff of Municipal Programs of Kansas Department of Health and Environment met to discuss the implications of this TMDL with the City Engineer from the City of Newton on March 8, 2006.

A general review of comments and responses was submitted as part of the January package. There were no comments specific to this TMDL included.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used) [40 CFR § 130.7].

KDHE will continue to collect bimonthly samples in 2010 at rotational Station 535 in order to assess the DO levels under this TMDL. Ongoing WRAPS sampling by Kansas State University will occur on Sand Creek over 2007 – 2010. Synoptic-intra-watershed sampling by USGS will occur at these locations on Sand Creek over 2007 – 2008. Based on these samplings, the status of impairment will be evaluated in 2011. Should impaired status continue, sampling in 2014 will be used to assess the status of Sand Creek after any upgrades at Newton are complete.

Reasonable assurance

Reasonable assurance only applies when less stringent WLAs are assigned based on the assumption of nonpoint source reductions in the LA will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads.

Reasonable assurances do not apply. The permitted facilities WLAs are set at levels that should result in Sand Creek meeting WQS. The submittal does cite a number of authorities that Kansas can use to direct activities in the watershed.